Effectiveness of stone columns: Field assessment

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Abstract: Ground improvement using stone columns was used for the foundations of an extension of a pump house. Three identical new centrifugal pumps are to be installed in such extension. Each pump weighs about 15.8 tons. The pumps will rest on one rigid footing measuring 4.5 Ã— 12 m. In addition to the static load carrying capacity, the design requires that a dynamic modulus of at least 500 MPa should be achieved for the foundation material. It was therefore necessary to improve the ground using vibroreplacement techniques. The fieldwork prior to and after the installation of stone columns consists of Cone Penetration Testing (CPT), Standard Penetration Testing (SPT), seismic cross-hole test and full-scale plate-loading test. Results have shown that the rigidity of the plate for the full scale loading is critical for the evaluation of the efficiency of the ground improvement technique. Furthermore, the CPT, SPT have yielded similar results indicating that the stone columns have improved the foundation material substantially. In addition, the seismic data confirmed the penetration resistance data. The details of testing and findings are presented. in detail in this paper.